

## A Framework for Supply Chain Coordination

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Abstract: This work begins with the analysis of a single link involving a monopolist Supplier, and a single Newsvendor. We focus on a general setting in which each player incurs non-negative economic costs which may include both fixed and variable portions. These values may be direct costs associated with value-adding activities, allocated costs through various accounting schemes, reservation profit levels, or some mixture of the three. Given this structure, we develop a graphical representation to show and explain to the reader/user/manager what constitutes a feasible contract as well as a Pareto-optimal contractual arrangement. We then develop two archetypal contract forms that coordinate this link. We refer to one as a Fixed Tariff Contract, in which the supplier guarantees itself a fixed payoff above its reservation profit level. The other is a Contribution Sharing Contract in which the supplier demands a fixed proportion of the expected contribution above the reservation profit levels. Next we show how several commonly used contract forms are instances or derivatives of these archetypal forms. Following that, we show how an understanding/use of these contract forms provides insights applicable to several current research topics in supply-chain management including cases involving a price-setting Newsvendor, a Newsvendor that affects demand via sales efforts, and contracting with the Newsvendor in the presence of asymmetric demand or cost information. Finally we explain how the application of these archetypal contract forms can be extended over several links forming a serial chain, as well as over a network of chains. We label such networks as Newsvendor Supply Chains. The results provide a useful mental model for characterizing supply-chain interactions.